

METHOD AND COMPOSITION FOR SELECTIVELY ETCHING AGAINST COBALT SILICIDE

Abstract of the Disclosure

An etching method for use in integrated circuit fabrication includes providing a metal nitride layer on a substrate assembly, providing regions of cobalt silicide on first portions of the metal nitride layer, and providing regions of cobalt on second portions of the metal nitride layer. The regions of cobalt and the second portions of the metal nitride layer are removed with at least one solution including a mineral acid and a peroxide. The mineral acid may be selected from the group including HCl, H₂SO₄, H₃PO₄, HNO₃, and dilute HF (preferably the mineral acid is HCl) and the peroxide may be hydrogen peroxide. Further, the removal of the regions of cobalt and the second portions of the metal nitride layer may include a one step process or a two step process. In the one step process, the regions of cobalt and the second portions of the metal nitride layer are removed with a single solution including the mineral acid and the peroxide. In the two step process, the regions of cobalt are removed with a first solution containing a mineral acid and a peroxide and the second portions of the metal nitride layer are removed with a second solution containing a peroxide. An etching composition including a mineral acid and a peroxide, preferably, HCl and hydrogen peroxide, is also described. The etching methods and compositions may be used in forming structures such as word lines, gate electrodes, local interconnects, etc.

EXPRESS MAIL MAILING LABEL NUMBER: EL88827000845

DATE OF DEPOSIT: 15 JANUARY 2002
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